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Impact of Preconditioning of Seed on Germination Percentage and Phenology of Lentil (*Lens Culinaris* Medie)

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Abstract: ***The present investigation entitled "Effect of seed priming on germination percentage and phenology of Lentil (Lens culinaris Medie)" was carried out at the experimental site of Department of Crop Physiology, Narendra Deva University of Agriculture & Technology, Kumarganj, and Faizabad-224229 (U.P.) during Rabi season 2012-2013 in Complete Randomized Design (RBD) with three replications and seven treatments on variety NDL-1. Observations were recorded at 30, 60 and 90 DAS. Cycocel (100 ppm, 200 ppm), GA_3 (250 ppm, 500 ppm) and IAA (250 ppm, 500 ppm) concentrations were used as treatments. The treatment was comprised of seed priming along with untreated control. The observations had been studied on germination percentage and phonological parameters of the NDL-1. Seed priming was performed for 8 hours. It is resulted from the study that GA_3 500 ppm significantly increased all the parameters followed by GA_3 250 ppm. Hence, the use of PGRs in lentil crop enhancing production and productivity by improving responsible traits for growth and yield.***

Keywords: Lentil, Phenology, Seed priming, GA_3, Cycocel

1. Introduction

Lentil (*Lens culinaris*) is a member of the Leguminaceae (Fabaceae) family. It is generally grown as rainfed crop during *Rabi* season after rice, maize and pearl millet. Lentil ranks fifth in the world production of pulses. India produces nearly one-third of the world annual production largely for domestic consumption (Turan *et al* .2007). Priming of seed is a physiological pre- conditioning which is widely used in various crops.Seed priming is normally practiced with water and can be improved further by selection of inorganic chemicals and growth regulators. Priming of growth regulators may improve the physiological efficiency and may play a significant role in raising the productivity of the crop. Normally lentil produces large number of flowers but most of them drop resulting poor yield. Available literatures suggest that growth regulators can be used as potential tools to enhance the yield of pulses by minimizing the several physiological constraints.

2. Previous Work

Previously some workers have study with the same objectives i.e. Kaur *et al*., (2003), Upadhyay (2004), Chauhan *et al.,* (2009), Islam *et al*. (2010) and Islam *et al*., (2010), still there are limited studies have been done on the role of growth regulators in overcoming low yield of Lentil and it is therefore considered imperative to study the effect of plant growth regulators on lentil.

3. Proposed Methodology

The present investigation entitled "Effect of seed priming on germination percentage and phenology of Lentil (*Lens culinaris* Medie) cv. NDL-1" was conducted at the experimental site of Department of Crop Physiology, N.D. University of Agriculture & Technology, Kumarganj, Faizabad (U.P.) during *Rabi* season of 2012-2013. The experiment was conducted in earthen pots with lentil variety NDL-1. The physio-chemical properties of soil *viz.,* texture-Sandy loam, pH-7.8, Organic carbon (0.64%), available nitrogen (256.50 kg/ha), available phosphorus (21.25 P_2O_5/ha), available potassium (28.75 K_2O/ha). Seed priming was done by soaking the seeds for 8 hours in distilled water Cycocel 100 ppm, Cycocel 200 ppm, GA_3 250 ppm, GA_3 500 ppm, IAA 250 ppm, IAA 500 ppm. Afterwards, seeds were taken and then dried under shade for control the seeds soaked in distilled water is used. Each pot was lined with polyethylene bag and filled with 8 kg well pulverized soil.

Five tagged plants were randomly uprooted from fallowing observations; germination percentage (Heydecker, 1972), , Phenology- days of 50%flowering, days of physiological maturity.

4. Result and Discussion

Effect of PGRs on germination percentage-

Effect of plant growth regulators *viz*., Cycocel, GA_3 and IAA had differential effect on germination percentage (Table 1).The result indicate that all the treatments increased the germination percentage and GA_3 500 ppm was registered maximum increase in germination percentage over control due to increased activity of α- amylase. These findings are in accordance with Ogbonna and abroham (1989). They reported that priming of seed of cowpea in GA_3 at 10 ppm improved rate of germination.

Table 1: Effect of Seed priming on germination % in Lentil

	Treatment	Germination percentage
T_1	Control	85.51
T_2	Cycocel 100 ppm	87.91
T_3	Cycocel 200 ppm	88.11
T_4	GA_3 250 ppm	90.04
T_5	GA_3 50 0 ppm	92.50
T_6	IAA 250 ppm	84.6 0
T_7	IAA 50 0ppm	82.60
	SEm±	1.47
	CD at 5%	4.46

Effect of PGRs on Phenology

PGRs initiated early flowering (Table1) and reduced the time taken to 50 % flowering. The effect of GA_3 was found more pronounced applied as priming. These findings are in close agreement with earlier reports by Deotale (1993). Minimum days to physiological maturity were recorded with GA_3 500 ppm with respect to control. Similar findings were reported by Khan *et al.* (2008) and Patel *et al*., (2012).

Table 2: Effect of Seed priming on phenology

	Treatment	Day of 50% flowering	Physiological maturity
T_1	Control	67.00	116.35
T_2	Cycocel 100 ppm	71.00	118.75
T_3	Cycocel 200 ppm	67.00	116.35
T_4	GA_3 250 ppm	67.00	117.40
T_5	GA_3 50 0 ppm	68.00	116.90
T_6	IAA 250 ppm	66.00	115.95
T_7	IAA 50 0ppm	69.00	117.75
	SEm±	70.00	117.90
	CD at 5%	71.00	118.75

5. Conclusion

The present field investigation concluded that, the application of Cycocel, GA_3 and IAA as seed priming improve the physiological efficiency of crop and resulted in better growth and yield of lentil cv. NDL-1.

6. Future Scopes

The present findings indicate possibility of use of PGRs in enhancing productivity of lentil by improving parameters responsible for growth and yield.

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